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The Chemical Fertilizer Market in Rwanda

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SUMMARY

Great disparities exist between the different provinces or within the districts of the same province as far as the fertilizer market is concerned. These differences can be observed in the areas of transportation, supply, training, farming, awareness, and motivation of the farmers.

The explanation for these variations lies in:

- uneven fertilizer promotion throughout the country,
- regional variation in the training provided to fertilizer users,
- uneven farmer motivation regarding fertilizer use,
- unequal current and past access to fertilizer supplies.

According to the wholesalers, more than half the amount of fertilizer marketed is absorbed by the potato-producing northwest (Gisenyi and Ruhengeri). Over 90 percent of the farmers interviewed in that area have attended awareness sessions and have adopted fertilizer. Fertilizer use on potato is very profitable. Supply is generally very good with fertilizer available in every commercial center. Investing in the fertilizer trade has become popular and profitable. In the other regions, the biggest fertilizer users are mostly the tea and rice farms.

The fertilizer traders are very cautious, which is why this activity exists only a complement to another one, and are always seeking substantial returns to their investment, as in any new and expanding market.

Farmers buy fertilizer from two sources: individual retailers (60%) and associations (40%) in the northwest. In the other regions associations play a more active role (96%) than the retailers (4%). Most of the retailers are found in the potato-producing areas (Gisenyi and Ruhengeri) while elsewhere this trade is in its beginnings.

In March 2002, the retail price of the different types of fertilizer between 220 and 250 Rwandan Francs (RF) per kilogram nationwide. Many of the people interviewed thought, however, that that was too high in view of the farmers' buying power.

In general, the associations have better storage facilities for the fertilizer. The retailers who have not been trained in fertilizer use, unlike the associations, do not make a distinction with their other products.

Fertilizer transportation is even costlier on all levels. The roads are hardly practicable, especially during the rainy seasons, with direct effects on fertilizer supply and sale of the agricultural products.

Compared with other countries, the fertilizer market is very limited in Rwanda. Not only is its marketing secondary and occasional, it is also poorly organized. However, it is worth noticing a certain increase in its use and in the number of people engaged in its trade, from the wholesalers to the users through the retailers.

ACRONYMS AND ABBREVIATIONS

AFRICHEM: Afrique et Chimie
ADSS: Association de Distribution des Semences Séléctionnées
AGROPHAR: Pharmacie-Agricole
AGROSA: Agronomie et Santé Animale
AGROTECH: Agriculture Technique
ALCOMEC: Alimentation et Commerce d'Engrais Chimique, Pesticide et Chaux
ATC: Association pour l'Amélioration des Techniques culturales
AGROBUSINESS: Agriculture et Business
COODAF: Coopérative de Développement Agricole, Elevage et Foresterie
COOVEPABU: Coopérative de Vente des Produits Agricoles de Butare
DRB: Développement Rural de Byumba
DRSA: Direction Régionale des Services Agricoles
DAP: Diaminophosphate
FCD: Fond de Coopération au Développement
GECI: Groupement d'Entreprises Commerciales et Industrielles
IAKI: Inter-groupement Agricole de Kibali
ISAR: Institut de Recherche Agronomique du Rwanda
KCL: Chlorure de potassium
MAP: Monoaminophosphate
NPK: Azote phosphore potassium
OCIR: Office des cultures industrielles du Rwanda
ONG: Organisation non gouvernementale
PDMAR: Projet de Développement des Marchés Agricoles au Rwanda
PGERB: Projet de Gestion des Espaces Ruraux du Buberuka
UNICOOPAGI: Union des Coopératives Agricoles de Gikongoro

INTRODUCTION

In Rwanda, the total cultivable land area is shrinking with time. These lands are becoming more and more infertile because of insufficient organic fertilizer use and mostly because of the lack of chemical fertilizer.

Most of the farmer do not own enough manure-generating cattle to cover their fertilizing needs.

Rwanda is also a country whose population is increasing more rapidly (a 15 percent increase between 1990 and 1999) than its agricultural production. This gap was 20 percent bigger in 2000 than in 1990 (development indicators in Rwanda, 2000: pp 48 and 204).

To solve this situation, the Ministry of Agriculture, Livestock, and Forestry has adopted several strategies. These include the regionalization of crops which led to an increased production of wheat, maize, beans, and potatoes in the high-altitude regions (Gisenyi, Ruhengeri, Gikongoro, Byumba, and Kibuye), soy, cassava, and sweet potatoes in the mid-altitude regions (Gitaram, Butare, and Kigali), sorghum and banana in the low altitude regions (east Kibundo, Umutara, and Bugarma) before 1994 and intensive use of fertilizer on the profitable crops.

Fertilizer, as a production-enhancing tool, has been adopted in Rwanda well before the events of 1994. There has been however been an unevenness to its introduction and spread, which accounts for the differences in use across the different regions of the country.

The following pages will detail the way the fertilizer market is organized.

This paper has six parts:

- Introduction
- A chapter describing the supply
- A chapter describing the marketing
- A chapter describing fertilizer use
- A chapter describing the evolution of the market
- Conclusions and recommendations

Methodology Used

The objective of this paper is to highlight the level of organization of the fertilizer distribution infrastructure. For that, a field survey was conducted in order to collect reliable data. The northwestern (Ruhengeri, Gisenyi), northern (Byumba), and southern regions (Kibuye, Gikongoro, and Butare) were targeted because of the great disparities between the northern regions which attract and absorb large quantities of fertilizer and the southern regions.

In all of these regions, all those involved in the trade and the use of fertilizers who have been identified by the MINAGRI projects were interviewed. A sample of traders and farmers who are not

yet involved have also been interviewed in order to learn the reasons behind their lack of involvement.

In the course of this survey, we have contacted a total of 71 people, including eight women. They were:

- 12 fertilizer-using farmers
- 12 non-fertilizer-using farmers
- 10 associations that trade in or use fertilizers
- 7 associations that did not use fertilizers
- 12 retailers that did not sell fertilizers
- 12 retailers that did sell fertilizers
- 6 fertilizer importers and wholesalers

We visited the following 24 districts:

Gisenyi Province: Gisenyi, Cyanzarwe, Mutura to the north, Gaseke and Gasiza to the south
Ruhengeri Province: Ruhengeri, Kinigi, Bukamba to the north, Bukonya and Nyarutovu to the south
Byumba Province: Kisaro and Byumba
Gikongoro Province: Gikongoro, Karaba, and Mudasomwa
Butare Province: Nyanza, Butare, Kibingo, and Gikongo
Kigali: Nyarugenge and Nyamirambo

CHAPTER I: THE FERTILIZER SUPPLY CHAIN

The fertilizer supply comes from imports. The majority of importers are in Kigali, even if certain traders in Ruhengeri, Byumba, and Gikongoro provinces hastily turn themselves into fertilizer importers.

The normal distribution chain for the other products goes from the importer to his agent, to the wholesaler, to the midlevel wholesaler, and finally to the user or consumer. This is not the case for fertilizer. Each importer is driven by the prospect of more profit.

The current fertilizer distribution chain goes from the importer who is also a wholesaler in Kigali to his agents (traders who, in addition to their usual activities, sell fertilizer obtained exclusively from one importer) or branch stores (owned by the importer) which in some provinces mostly double up as retailer stores.

At the district and sector level, fertilizer is supplied in large part by the farmer associations, according to 90 percent of those interviewed, and by individuals. With the exception of the potato-producing northwest where individual traders abound, trading elsewhere is done in general by the associations. In the northwest (volcanic soils) fertilizer trade has become a widespread activity, even at the lowest level.

Some importers sell anything from low quantities,1 to 50 kilograms, to high quantities, tons, depending on demand.

The customer can generally skip many levels of the supply chain and go directly to the wholesaler's agent or the wholesaler, depending on his ability to deal with constraints like distance. This is an advantage to both the user/customer and the wholesaler, but a disadvantage for the retailers who cannot benefit from the increased price he could otherwise charge the customer.

1.1 Supply Chain for the Wholesalers and the Importer

There are four permanent fertilizer importers in Rwanda: GECI, SAFARI CENTER, AGROBUSINESS, and VIRUNGA TRADING. The other importers operate irregularly and only when the opportunity exists.

Former importers Agrotech and Agrophar cite the presence of "too many importers" as a reason for their departure from that position in the market. Today they limit themselves to fertilizer retail.

In ordering fertilizer, the importers take into account the sources capable of supplying the desired quality, the transport costs, and the cost of the product. Their main suppliers are in Mauritius and South Africa for the NNPK 17.17.17 variety of fertilizer, in Abu Dhabi for urea, and in the USA via Nairobi, Kenya, for the DAP variety.

Ordering fertilizer from other far away countries, even at favorable prices, will increase its cost given the long distances.

1.2 Supply Chain for the Retailers (Individuals and Associations)

In the fertilizer distribution area, there are numerous retailers, individuals and associations. Different conditions in different provinces make each supply chain different from the others.

The fertilizer traders are somewhat different depending on the region they operate in. In the potato-producing provinces of Gisenyi and Ruhengeri, the retailers can be found in all the trading centers (one to five retailers per center). There are also those who sell fertilizer on the open-air markets on market days.

In the southern provinces of Gisenyi and Ruhengeri, these retailers only represent an insignificant proportion. One to three can be found in one district and they are based in the most active trading center (one in the Gasiza district, three in Bukonya). They get their supply from the town of Ruhengeri half a day's journey away.

The associations are active in fertilizer trading in all the provinces visited. They are generally organized, in "inter-groupements" in which many associations come together in the pursuit of their common objective, making supply easier. In Gisenyi, there, however, associations that also pool together their resources to make supply of fertilizer and other agricultural and veterinary products easier without forming "inter-groupements".

In Byumba province, we found associations organized in "inter-groupements" which are responsible for supplying them with fertilizer and other products. In turn, the associations supply their members.

A dozen associations operate throughout Kibuye province. They are assisted by the Fond de Cooperation Belge (FCD of the Belgian Cooperation) and are not organized in "inter-groupements". These associations order from the project and each is supplied according to their needs. There are no other fertilizer-retailing associations or individuals. A supply problem can be predicted for Kibuye if at the end of this project no step is taken to strengthen the current supply chain.

In Gikongoro fertilizer is traded through the associations organized under the Gikongoro-based UNICOOPAGI (Union of agricultural cooperatives). The associations which can be found in every district, buy the fertilizer from the cooperatives and retail it through the Association Sainte Rita which has recently set up a sales agency in Mudasonwa (Gasarenda) in addition to the one it already has in the town of Gikongoro.

Such associations have also been reported in certains districts around the town of Butare (Save and Kirujura) in Butare province.

The presence of fertilizer of unknown origin and chemical composition has been reported in Gikongoro, Ruhengeri, Byumba, and Butare provinces. This could spoil the market and also lead to the wrong products being used on the wrong crops.

Because they have a better access to the supply and storage facilities, and can buy on credit from the suppliers, and because of the large quantities they order (representing the combined needs of all their members), the associations can help bring the cost of products down.

Table 1: Major fertilizer traders per province and their sources of supply.

Province	Major Traders	Fertilizer Types	Sources of Supply
Town of Gisenyi	ALCOMEC	NPK 17.17.17 DAP Urea	GECI
Gisenyi Mutura	Jonas Ngarambe ACT	NPK 17.17.17, MAP, DAP, Urea	Safari center Agrobusiness center
Ruhengeri	"Inter-groupements" working with COODAF Other associations Virunga Trading GECI	NPK 17.17.17, Urea, DAP NPK 17.17.17, DAP NPK 17.17.17, Urea NPK 17.17.17, DAP, Urea	COODAF via GECI Traders in Ruhengeri Nairobi GECI Kigali
Byumba	IAKI (inter-groupement)	NPK 17.17.17, DAP, Urea	Traders in Kigali
Kibuye	Associations trained by FCD	NPK 17.17.17, DAP, Urea	Traders in Kigali
Gikongoro	UNICOOPAGI Sainte Rita Association	NPK 17.17.17, DAP, Urea NPK 17.17.17, DAP, Urea	Traders in Kigali GECI
Butare	AGROSA GECI Sainte Rita Association COOVEPABU	NPK 17.17.17, DAP, Urea NPK 17.17.17, DAP, Urea NPK 17.17.17, DAP, Urea NPK 17.17.17, DAP, Urea	Traders in Kigali GECI GECI Traders in Kigali

As the table shows, the dominant supplier at the province level is the Groupement d'Entreprises Commerciales et Industrielles (GECI). It also shows that the sources of supply generally obey the laws of supply and demand.

1.3 Supply Chain for the Users (Farmers and Associations)

Fertilizer users from the northwest provinces of Gisenyi and Ruhengeri get their supply mostly from the retailers in Ruhengeri. The associations, grouped in "inter-groupements" that work with COODAF get theirs from the latter under a contract that guarantees on-credit purchase. Other associations we met simply deal with the various retailers, just as all the other users.

The high number of retailers eliminates the distance problem (on average less than five kilometers).

In the southern districts of the provinces of Gisenyi and Ruhengeri, supply is made more difficult by the small number of retailers. Interviews revealed that farmers in Gasiza and Bukonya get their supplies on average more than ten kilometers away.

In Byumba province, supply is done in two ways. The agricultural training center in Kisaro, which trains farmers on radical terracing and fertilizer use, gets its supplies directly from Europe. It rarely deals with local traders. The type and chemical composition of fertilizer used depends on the results of soil analysis, and the locally-available fertilizer generally does not match. One of the types used, for instance, is NPK 7.14.28.

The associations are supplied by the "inter-groupements" which get their supplies from Kigali. The users interviewed in that province get their from the town of Byumba.

We have not met any private traders in Kibuye province where the associations and individuals are supplied by the fertilizer-trading associations.

In Gikongoro associations are supplied by UNICOOPAGI, while individuals can either go to UNICOOPAGI or to the Association Sainte Rita. Unfortunately, some of these individual farmers are known to sell the fertilizer thus obtained to other farmers who use it on the wrong crop, leading to production problems.

In Butare there are four major suppliers: GECI, Association Sainte Rita, AGROSA, and COOPVEPABU.

It is worth mentioning that some fertilizer from Burundi also flows into Gikongoro and Butare provinces. Some of the people interviewed reported that some traders from both sides of the border deliberately put fertilizer, such as one recommended only for tea and coffee, into bags bearing the wrong markings. But these are not widespread occurrences because most users know the retailers and associations who trade in fertilizer.

With the exception of the northern areas along the volcanoes, two obstacles to supply exist almost everywhere else. The small number of sales agencies, leading to distance problems, and the high price of fertilizer.

Fertilizer supply to farmers occurs in two ways: individual retailers (60 percent) and the associations (40 percent) in the northwest. In the other regions, associations account for 96 percent and leaving individual retailers with four percent. Most of the retailers are found in the potato-producing areas (Gisenyi and Ruhengeri), as opposed to other areas where this type of activity is only just beginning to take root.

1.4 The Carriers (Transporteurs)

Fertilizer is transported in four ways: by wholesalers and importers, by individuals who have their own means of transportation, by individuals who get together to solve their transportation problems, and by using transportation in the rural areas.

1.4.1 Transportation By Importers From the Port to Kigali

Some importers have their own vehicles, while others rent them. Of all those importers interviewed, only GECI has its own trucks. However, even though the others see this as an advantage, there is no clear evidence of impact on the price.

1.4.2 Province-Level Transportation

When needed, the importers will transport the fertilizer from the main storage areas to their stores or their agents in the provinces. Sometimes, they will also deliver it to their customers, and the cost of delivery will depend on the amount ordered. GECI charges four RF per kilogram for a fifty-ton order. An order of 1.5 tons or more will be delivered for free within the confines of the town of Kigali.

Some traders who possess their own means of transportation deal with fertilizer transportation/transport just like that of any of their other products, the emphasis being on profitability.

Some customers, such as "inter-groupements" who maintain stocks in the provinces, carry their fertilizer in rented vehicles. From there, some associations, such as those in Gikongoro, pool together their resources and commission UNICOOPAGI to carry their orders to them. In Kibuye, they rely on FCD for that.

Road conditions-related transportation problems are few up to the provincial capitals, but numerous from there to the districts.

The fertilizer transportation companies are essentially based in Kigali and Ruhengeri, the main trading centers. It is still possible to rent vehicles in the other provinces.

1.4.3 Transportation at the District Level

Means of transportation are rare here and generally only the inhabitants of or those that trade within a region will get involved. Fertilizer is transported along with other goods and, when public transportation is available, that occurs in small quantities.

1.4.4 Transportation in the Rural Areas

From the district, fertilizer is carried on the head to the user, mostly because the quantities involved are small (one to five kilogram), or simply because there are no other means of transportation.

In some regions, because of the poor road conditions, conventional or locally-made bicycles (ibicuguti or ibitogo) are widespread in the north (Gisenyi and Ruhengeri) and in Gikongoro.

1.4.5 Transportation Cost

Transportation cost generally varies depending on distance and quantity ordered.

Importers charge between 200 and 300 RF per bag, or four to five RF per kilogram up to Butare (125 kilometers), Gikongoro (152 kilometers), and Ruhengeri (91 kilometers). Private carriers will charge two to three times that rate.

Using conventional or locally made bicycles brings the cost down to one RF per kilogram on a distance of one to three kilometers.

In the southern parts of Gisenyi and Ruhengeri provinces fertilizer is transported along with other goods at a cost that does not exceed one RF per kilogram when considering handling charges.

Using one's own vehicle, it costs about six RF to transport/carry fertilizer from Kigali to downtown Gikongoro, including handling charges. But, according to the Association Sainte Rita, that would cost 10 to 15 RF in a rented 4-ton pickup truck. From Kigali to Butare, the total cost is ten RF per kilogram. According to FCD, Kigali to Kibuye would go up to 350 RF per ton and per kilometer.

The problem for the retailers is that fertilizer orders are never substantial enough to allow large quantities to be transported at the same time.

In most cases, carriers who engage in fertilizer transport do not have other products to carry. From the provinces of Gikongoro, Butare, and Kibuye vehicles have run empty all the way to Kigali where they load up with fertilizer and other goods.

Table 2: Cost of Long and Short Haul Transportation Per Ton and Per Kilometer, Depending on Mode Used

Long Haul	Butare	Gikongoro	Ruhengeri
Rented truck (handling fees excluded)			
Cost for a 50-kilogram bag	400	650	400
Cost per kilogram	8		
Distance from Kigali	125		
Cost per ton/kilometer	64		
Short Haul	Ruhengeri	Gisenyi	Gisenyi
Rented pickup truck or taxi (handling fees excluded)	Kidaho	Kabaya	Kabumba
Cost for a 50-kilogram bag	150	100	200
Cost per kilogram	3	2	4
Distance from principal town	30	50	50
Cost per ton and per kilometer	100	40	80
Bicycle (wooden and metal)	Butare (subsurbs)	Gikongoro Karama	Ruhengeri Kinigi
Cost for a 50-kilogram bag	50	200	300
Cost per kilogram	1	4	6
Distance from principal town	1	10	20
Cost per ton and per kilometer	1000	400	300

The table shows that the cost per ton per kilometer is higher using a wooden or a metal bicycle than when renting a pickup truck or a seat in a taxi, because of the difference in the quantities involved and the scarcity of means of transportation.

In pickup trucks and taxis, the fertilizer is carried along with other commercial goods. The cost is lower on long distances, maybe because of the road conditions.

In conclusion, it is cheaper to use one's own vehicle and to ship larger quantities over long distances.

1.5 Ways of Purchasing Supplies

Buying power is generally very low at all levels in Rwanda and both traders and end users of fertilizer suffer from of insufficient or lack of funds to buy supplies.

Importing fertilizer require substantial amounts of money. Commercial banks require loan guaranties and interest rates that the importers cannot afford. Some importers have been able to secure short term credits good for one or two orders, while others secure some credit from PDMAR.

Wholesalers deal in cash and rarely allow agent and other buyers to purchase on credit, which hampers sales. They claim to have suffered heavy losses in the past when loans were not repaid.

Credit is only given to organizations with a clear formal statute and the loan is short term, between 15 and 30 days. Some wholesalers will give credit to their trusted customers in exchange for a guaranty check that can be cashed after an agreed-upon deadline. Sales on credit that used to account for 30 percent of the total are now only worth five percent today.

1.6 Fertilizer Storage

Fertilizer is stored by both associations and individual retailers.

All the private retailers lack the necessary infrastructure (warehouses and pallets) to store fertilizer. As a result, fertilizer bags share the same shelf space as the other goods in their stores. The 50-kilogram bags simply lay on the bare floor and/or on plastic bags or straw piles.

This lack of adequate storage facilities affects in general all the traders in all the provinces. On the other hand, all the associations surveyed have their own warehouses and pallets for fertilizer storage.

Wholesalers fertilizer stocks vary as a function of their financial situation of the moment and of the market. Stocks typically reach their peak at the beginning of the rainy seasons (for example, 140 tons for Agrophar and 2,000 for GECI) and are almost nil (five tons for ADSS and 100 tons for GECI) during the period between them (June to September).

As for the associations, they have inherited the infrastructures left behind by the projects that are now gone and by NGOs or other organizations that were training them. In Ruhengeri, some inherited the storage hangars that used to belong to COODAF, others got those of World Vision.

In Byumba the associations were given warehouses by the project DRB while those in Kibuye get to use ones that were built by the NGO Aide Suisse en Cas de Catastrophe for the community. In Gikongoro, the associations inherited the warehouses left behind by the project PDAG.

Ninety-nine percent of those surveyed have not received any training in handling the toxic products that they are selling and handling, especially when it comes to adequate physical separation between fertilizers from their other commercial goods. From the small-scale user to the importer, none of those interviewed used gloves, masks, boots, or any other necessary protection gear.

It is, however, clear that almost all the associations have received some training in storage techniques: use of pallets, physical separation of products, ventilation, storage system, and record-keeping. However, although some 10 to 20 percent of the workers cover their hands, their respiratory systems are still exposed.

CHAPTER II: FERTILIZER MARKETING

2.1 Characteristics of Fertilizer Marketing

At all levels, fertilizer is marketed with great prudence and with profits in mind, which makes it always complementary to another commercial activity. It becomes an importer's primary commercial activity, and only for a short time, when demand is strong. Table 3 shows the major commercial activities of the importers.

Another characteristic of fertilizer trade is the small portion of the working capital that is devoted to fertilizer trade, compared to the other activities by the same trader. (Safari Center 40 percent, Agrophar more than 50 percent, ADSS 21 percent, GECI 25 to 35 percent, and Agrobusiness 60 percent of the working capital)

Table 3: Other activities of the fertilizer importers and quantities sold annually (2001)

Name	Start date	Primary activity	Fertilizer quantity sold in 2001 (in tons)	
Agrophar	1997	Trading in veterinary products and material, and high-quality stock seeds	NPK 17.17.17 DAP Urea	70 10 50
Africhem	1995	Agro-industry (veterinary and chemical products	NPK 17.17.17 KCL MAP	100 30 30
Agrobusiness	2000	Trading in food products	NPK 17.17.17 DAP Urea	420 210 70
ADSS	1998	Transportation and supplies	NPK 17.17.17 DAP Urea	40 60 60
GECI	End of 2000	Trading in food products (rice)	NPK 17.17.17 UREA DAP	100 600 400
Safari Center	End of 2000	Consultancies and trade in plant health products (dithane)	NPK 17.17.17 Urea	600 200
Virunga Trading	1999	Trading in food products (rice)	NPK 17.17.17 Urea	400 400

As shown by table 3, a total of 4,500 tons of fertilizer was reportedly sold by wholesalers and importers. This number may go up to 13,000 tons when taking into account the quantities sold by other importers that have not been registered as such, such as the NGOs, OCIR, and other traders.

All these traders lack devoted marketing channels. Information about product availability and quality spreads informally and spontaneously, and farmers use their connections and experience to educate themselves on that.

In some cases, fertilizer is just made available without any information on use and storage.

The retailers who have not yet ventured into the fertilizer business hesitate to do so for many different reasons, including too many fertilizer traders in the northwest and too small a demand elsewhere.

Those retailers who have gone into but have pulled out of the fertilizer business gave the same reasons as above for pulling out.

In response to demand, orders for fertilizer are usually placed in September, October, November, and March and April. Depending on their financial means, the retailers generally order in many chunks.

2.2 Fertilizer Price

Prices vary from one seller to the next and from area to area, but the user will generally buy it between 220 and 250 RF per kilogram. As shown in tables 4 and 5, the importer-wholesaler pays between 180 and 200 RF.

Table 4: Fertilizer Price as Sold By the Importer

Importer	Province	Fertilizer type	Price (in RF per 50-kilogram bag)
GECI	Kigali	NPK 17.17.17 DAP Urea	9,000 – 9,200 9,200 9000
Safari Center	Kigali	NPK 17.17.17 Urea	9,300 9,000
Agro Business Center	Kigali	NPK 17.17.17 DAP Urea	9,000 9,400 8,800
Africhem	Kigali	NPK 17.17.17 MAP Urea	9,200 9,200 9,200
Virunga Trading	Ruhengeri	NPK 17.17.17 DAP Urea	9,000 8,900 8,900
Uzabakiliho Jean	Ruhengeri	NPK 17.17.17 DAP Urea	9,000 – 9,200 9,200 9000

Prices at the importer level are almost identical in Kigali and Ruhengeri, with slight differences due to the law of supply and demand. According to Agrophar, ADSS, and GECI, there has recently been an increase in the demand for DAP, compared to the other types. However, in response to the requests of its customers in Ruhengeri who have observed its beneficial effects on crops, Africhem has introduced MAP instead of DAP.

Farmers report better yields with MAP and DAP than with NPK 17.17.17 and urea, which drives up the price of the first two.

Table 5: Sale Price Versus Purchase Price in the Different Provinces

District	Source of supply	Fertilizer type	Acquisition price (RF /kilogram)	Retail price (RF /kilogram)	Net profit (RF/kilogram)
Cyanzarwe	Jonas Ngarambe	NPK 17.17.17 Urea DAP	185 180 180	220 220 220	35 40 40
Town of Ruhengeri	"Inter-groupements" working with COODAF Other associations	NPK 17.17.17 Urea DAP	180 180 180	220 220 220	40 40 40
Bukamba Kinig	Traders	NPK 17.17.17 NPK 17.17.17	190 190	220 230-250	30 40-60
Bukonya	Ruhengeri traders	NPK 17.17.17	190	220	30
Kibali	IAKI (town of Byumba)	NPK 17.17.17	190	220	30 30 30
Rubengera	Various trading associations	NPK 17.17.17 Urea DAP	190 190 190	220 220 220	30 30 30
Town of Butare	AGROSA COOVEPABU Association Sainte Rita	NPK 17.17.17 Urea DAP	190 190 190	220 220 220	30 30 30
Gikongoro	UNICOOPAGI Association Sainte Rita	NPK 17.17.17 Urea DAP	190 190 190	220 220 220	30 30 30

As shown by this table, the user pays generally between 220 and 250 RF per kilogram. This price increases with distance, and import and storage costs.

Table 6: Estimated Cost and Profit For a Wholesaler in a Provincial Capital

Cost	Ruhengeri	Gisenyi town and Mutura	Gikongoro	Butare
Purchase price in Kigali	180	180	180	180
Transportation	8	12	13	10
Handling	2	2	2	2
Various expenses	20	20	20	20
Total	210	214	215	212
Sale price	220	220	220	220
Net profit	10	6	5	8

The numbers in table 6 assume transportation in a rented vehicle. We can also see that large orders lead to savings in the form of lower transportation costs, around four RF per kilogram.

At the province level, the traders are both wholesalers and retailers. The wholesale price of fertilizer varies between 190 and 200 tons depending on demand.

The numbers under the heading Various expenses include the cost of packaging material, handling, transportation for the trader himself, communication, and food and other unforeseeable expenses.

Table 7: Estimated Costs and Profits For a District-Based Retailer Supplied From a Provincial Capital

Cost (per kilogram)	Kabaya (South Gisenyi)	Gisenyi Kabumba (Mutura)	Ruhengeri (Kidaho)	Ruhengeri (Kinigi)	Butare town	Gikongoro (Karama)
Purchase price, downtown	204	185	190	190	200	210
Transportation	2	4	3	6	1	4
Handling	2	2	2	2	2	2
Various expenses	20	20	20	20	10	20
Total	228	211	215	218	213	236
Sale price	230	220	220	230	220	240
Net profit	2	9	5	12	7	4

The retailers surveyed (considered) carry their fertilizer on rented metal and wooden bicycles and in public transportation vehicles where they exist. Clearly, they cannot tweak the cost of transportation to boost their profit margins.

The sole retailer that we found in Kabaya claims almost no profit, as can be seen in column 1 of table 7. He had even exited this trade, but a meeting organized by the Ministry of Agriculture, Livestock and Forestry convinced him to return.

Retailers in Butare get their supplies in the same town and transports them on bicycles, saving on transportation costs.

We can also see that the longer the distances, the more difficult it is to find vehicles for transportation and thus the higher the cost. Such is the case for Kabumba-Gisenyi and Kinigi, close to the volcanoes.

From tables 5 and 6, we can conclude that profit margins are higher for those who have their own transportation vehicles and also for those who can order in large enough quantities to benefit from transportation from the importer who supplies them.

2.3 Packaging

Fertilizer is sold in anything from one to 50-kilogram bags, depending on the customer's request. Then, a wholesaler like Agrobusiness had the idea of standardized packaging, using appropriate material, giving the customer the choice of 50, 25, 15, 10, and even 5-kilogram bags, all bearing the same labels.

2.4 Training for Fertilizer Traders

The fertilizer traders are not trained to deal effectively with their product. All the wholesalers and their employees that we interviewed expressed a desire for some rudimentary training in the identification of the components of their different products and handling. Ninety percent of the wholesalers would like to be able to work more closely with their farmer-customers in the area of soil analysis in order to help them improve their production by going beyond the expensive NPK 17.17.17 formula which is expensive and used exclusively on all soil types, as practiced by Africhem, Kisaro, and Agrobusiness. This desire is especially strong in the northwest.

2.5 Types of Fertilizer Sales

Transactions are usually conducted in cash. When credit is involved, various conditions are set. No interest is charged and no other guaranty than a check is required of the buyer, as on-credit sales are based on faith.

In the potato-producing northwest, some wholesalers will sell on credit when half of the order is paid for and the rest no later than three months hence. Others will request a check as a guaranty for the unpaid second half.

In other cases, credit is given on faith, but payment must occur within two weeks. This type of transaction is found between wholesalers and retailers, and between retailers and end-users.

Another form of credit involves payment in kind. In Butare, GECI sold fertilizers to rice farmers in Mugusa at 180 RF per kilogram and got back rice at 145 RF per kilogram. This contract was negotiated between representatives of both groups.

In all cases, credit is generally given to customers who buy frequently and in large quantities. Credibility and personal ties with the supplier also help. Credit sales account for ten percent or less of total fertilizer sales.

Retailers and wholesalers generally refrain from selling on credit, arguing that they cannot afford it. When they do give credit, it is for short durations, two weeks maximum, and only to people whose honesty has been proven. Reimbursement is generally guaranteed in these cases.

Associations that sell fertilizer also give credit, to their members who pay after harvest or before that ithey can afford it, and to nonmembers depending on their personal relations with the association. In any case, only those associations that can cover for their members engage in credit sales. When a member cannot pay, such as when a catastrophe occurs, the association will give them more time and will eventually even help them repay their debt. More and more, however, associations are restricting credit sales to its members because there have been many deliberate defaults.

Credit is viewed differently in different provinces. In the big potato-producing areas, the farmers hold mixed views on credit. Some would like to be able to buy fertilizer on credit at the beginning of the crop season and repay at the end of it. Others would like to spread the repayment over time depending on each individual's means, but not longer than one season. In any case, credit would be allocated depending on the user's needs and total land holding. Whether it came from the district as part of the decentralization program, from PDMAR, or from elsewhere, credit would be allocated to individual farmers. The local authorities would be involved in the selection of beneficiaries and in debt collection, because they know the farmers who really deserve credit.

It is clear that farmers are thinking about three types of credit: credit between retailer and farmer, between association and farmer, and other credits that would be made available by various physical and moral individuals. The farmers are already benefiting from the first two types of credit and are asking for help from local authorities in order to secure the third type as well.

In the south, those interviewed in Gikongoro, Kibuye, and Butare are more or less reluctant towards credit because they are never sure about agricultural production without which it would be hard for any farmer to repay any debt. Not willing to risk anything, they prefer to buy what they can pay for.

In Byumba credit is financed (for instance by NGOs, the districts, or the traders) through the "inter-groupements" and payment is spread over a period of two years.

The associations also sell other products than fertilizer for whom retailers are rarely found, such as seeds, agricultural tools, and veterinary products, and their primary goal is not to make profit but to help farmer acquire these at a reasonable price.

2.6 Profile of the Fertilizer Buyers

There are two categories of buyers: associations and individual farmers. In the big potato-producing areas all categories can be found, representing different buying powers: young, old, men (rarely women), and ordinary and professional farmers. Even though women participate in fertilizer use, men still decide if and when to buy because they are the primary authority in the family.

In the other provinces, especially in Butare, many customers are the less-than-40s, the vegetable trade, or the religious congregations that know how to use fertilizers. They are mostly vegetable farmers (tomato, cabbage, carrots, pepper, onions, and leeks). The rice farmers have their own supply system and do not generally deal with the retailers.

CHAPTER III: FERTILIZER USE

In the areas visited, fertilizer has two main users: the associations and the farmers. Among the latter fertilizer use varies depending on every individual's level of knowledge about fertilizer, financial means, and ease of access to the sales agencies. Fertilizer users do have the means and the knowledge to check the quality of their purchases.

According to the importers and the wholesalers interviewed, 50 to 60 percent of the orders are for the northwest, 30 to 40 percent are split between the other provinces, especially Gikongoro, Byumba, Gitarama, and North Kigali. The remaining ten percent go to the areas that have not been mentioned.

3.1 Individual Farmers and Associations

In Gisenyi and Ruhengeri provinces there are two distinct fertilizer-using areas.

3.1.1 Areas with Volcanic Soils

These areas are very favorable to fertilizer use and the farmers have long been trained to use of fertilizer as part of their agricultural activities, especially in potato and vegetable cultivation, which accounts for the remarkable development of the fertilizer market. This market relies primarily on the districts of Mutura, Cyanzarwe (former Rwerere), and part of Kanama, Mukingo, Kinigi, and Kidaho.

3.1.2 Areas with Non Volcanic soils

The reverse situation exists in the southern part of these provinces. There are very few fertilizer users in Ruhengeri and Gisenyi. Equipped with different levels of awareness, the users do not feel the same need as their northern neighbors to use fertilizer, which does not help its trade.

In Byumba the fertilizer users are found mostly in the district of Buyoga where an agricultural training center exists which practices radical terracing and has introduced its hundred or so laborers, and the rest of the population to the benefits of fertilizer use. Several fertilizer-using associations can also found in this district. Bungwe district (Cyumba-Kivuye), which located at a high altitude, is also a big fertilizer user.

In Kibuye, Gikongoro, and Butare provinces, the fertilizer users are generally the schools, the religious congregations, and the individual members of the associations. The other individual farmers rarely use fertilizer in these provinces.

In conclusion, in the areas visited, the main fertilizer users are: the farmers' associations and a small proportion (four percent) of isolated farmers. This contrasts with the volcanic areas where, according to those interviewed, the majority of people are independent farmers.

3.2 Fertilizer application

The individual farmers using fertilizer lack formal training in that area. This, coupled with the supply problems and their limited financial means, leads to misuse. Almost all those interviewed use 2 to 2.5 kilograms of fertilizer per are (100 square meters) on their potatoes, while MINAGRI recommends three

kilogram per are when sowing in seed holes. Seventy percent of the farmers interviewed do not make a distinction between the types of fertilizer or the crop variety when talking about amounts to be applied.

The associations, on the other hand, receive a lot of training and are better at disseminating important information to their members than to nonmembers.

3.3 Cash and Industrial Crops

The level of awareness on soil fertilization is high in this area of agriculture. Almost all the farmers trained by OCIR-Thé and OCIR-Café know the importance of fertilizer use, the appropriate dosage to be used, and how to handle it. Very few of those interviewed use smaller doses than prescribed, citing limited financial means.

The farmers generally receive the fertilizer from their trainers at the beginning of the season and repay at harvest time when the amount owed is directly taken from the farmer's pay.

Table 8: Crops On Which Fertilizers Are Applied in Different Provinces

Provinces	Zones	Crops
Gisenyi	Volcanic soils	Potatoes, corn, vegetables (cabbage, carrots, and leek)
	Non volcanic soils (south of the province)	Wheat, vegetables (tomatoes)
Ruhengeri	Volcanic soils	Potatoes, corn, and vegetables
	Non volcanic soils (south of the province)	Vegetables, beans, and potatoes
Byumba	Kisaro	Potatoes, wheat, beans, vegetables, marcuja
	Bungwe	Potatoes and beans
Gikongoro	High altitudes (Mudasomwa, Nshili, Kivu, Muko, Musebeya)	Potatoes, wheat, and beans
	Central part of the province	Vegetables and beans
Butare	The whole province	Vegetables and rice
Rest of the country	Other provinces	Industrial crops (coffee and tea) and cash crops (rice, flowers, and sugar cane)

Crops are selected for fertilizer application depending on the duration of their vegetative cycle and their capacity to generate revenue..

This table shows maracuja being cultivated and fertilized in Byumba in Kisaro district. This crop requires a lot of fertilizer and, according to those interviewed, will be turned onto juice in the days to come.

3.4 Importance of Fertilizer Use in the Eyes of/for the Farmers

According to 90 percent of the fertilizer users, especially the individual farmer interviewed, there is a socioeconomic dimension to fertilizer use: social because it increases production and makes it possible to feed one's family, save some grain for seed, and help other people in need. The economic aspect of fertilizer use comes from the fact that the increased production allows the user to used hired labor in the fields, buy other seeds and agricultural implements, and buy pesticides and various household items. However, the profit thus realized is still not large enough to allow savings.

3.5 The Demonstrations of Fertilizer Use

In the past some projects and NGOs that operated in the various districts have run practical demonstrations of safe and efficient fertilizer use. All fertilizer users agree on the importance of these demonstrations. Of those nonusers interviewed, 70 percent share this view.

Today these demonstrations do not take place in all the districts, although PDMAR is trying very hard to hold them wherever possible. The portion of the population that needs them is simply too large.

In Butare and Gikongoro provinces for instance, there is practically no field on which to conduct demonstrations. Today, the technicians lack the transportation and material means to set them up. Those people interviewed do not know anything about the demonstration sessions held by PDMAR.

In the areas of Gisenyi and Ruhengeri where COODAF is present, fields for conducting demonstrations exist and their purpose is to teach farmers how to produce good potato seeds using the proper technological tools, including fertilizer. In the other districts of Gisenyi PDMAR holds demonstrations, but at a small enough scale that the farmers from our sample know nothing about them.

In the other districts of Ruhengeri, the project PGERB often demonstrates fertilizer use on wheat, potatoes, and beans.

In Kibuye, the only demonstrations mentioned are conducted by the project FCD in the potato-producing areas, in Kanage and Rutsiro districts. According to the project, these demonstrations are conducted using NPK 17.17.17 and a combination of Urea and DAP, and reach not more than 20 percent of the population being trained. There are not enough resources to extend them to all the regions of the province. PDMAR also conducts demonstrations in Budaha (former Kivumu) and Itabire districts, in collaboration with progressive farmers.

In Byumba there is no demonstration field. However, for many farmers, the training center in Kisaro is a training place for the laborers who will later apply their knowledge on their own fields.

3.6 The non fertilizer using farmers

For a variety of reasons, many farmers in many provinces do not use fertilizers. Some of the reasons given vary from the absence of information on fertilizer to the absence of fertilizer sales centers. Other farmers simply cannot afford it financially.

In the big potato-producing areas of Gisenyi and Ruhengeri, less than one percent of the farmers do not use fertilizers according to the 12 people interviewed. In the southern part of these provinces, however,

fertilizer use is much weaker, according to the same source. All these non users are aware of the importance of fertilizer, but cannot afford it.

According to nine percent of the 22 people interviewed, the farmers in Byumba, Kibuye, and Gikongoro are well informed on fertilizer use and importance but most are constrained financially and those who are not experience difficulty getting to and from the sales points.

Information on fertilizer use was better disseminated in the northwest than in Butare. In the latter province, that knowledge about fertilizer use is stronger in the districts surrounding the town and those around the rice fields, and becomes weaker with increasing distance from these areas.

CHAPTER IV: EVOLUTION OF THE FERTILIZER MARKET

4.1. Evolution at the wholesaler and importer level

Wholesalers have a different view of the growth of the fertilizer market in Rwanda. Some see it as slow, a rate of five percent annually for Agrophar and ten percent for ADSS, while others see it as strong, 25 percent for Agrobusiness. According to the latter group, it is not the number of users that has not grown, but the quantities of fertilizer used. The truth is, however, that the number of fertilizer users has indeed increased.

Some, like Safari Center, believe in a future growth strong enough to lead to the creation of a fertilizer factory. This would limit the price hikes due to transportation and packaging, as well as various tax problems.

Faced with increased competition from newcomers in the business, other importers, especially the older ones like Africhem, predict a negative market growth. Their pessimism seem unfounded.

Overall, fertilizer trade has grown positively since its beginnings, especially at the importer level.

Table 9: Branches and agencies of the importers

Importer	Start date	Branch	Start date	Agency	Start date
GECI	1999	Ruhengeri Butare	November 2001 Beginning 2002	Gisenyi Gikongoro	January 2002 End of 2001
Agrobusiness	End of 2000	Ruhengeri	Scheduled for April 2002	None	
Safari Center	November 2000	None		Gisenyi Ruhengeri Gitarama	Beginning 2001 Beginning 2001 End of 2001

This table shows that the importers interviewed began their activities around 2000 and are in the process of decentralizing them. This is beneficial to all, since it gives the province-level retailers more supplier choices and it also reduces the distance to the nearest supplier. All the branches and agencies were created after November 2001 and there is reason to hope for a growth of their activities in the future.

We can also see that the more importers there are, the better it is for the traders who are interested in becoming their agents all around the country.

In the potato-producing areas, the number of retailers has increased, over five fold since 1999 in places like Ruhengeri and Gisenyi. In the other provinces that increase has been timid. There is still no retailer in Kibuye and only one in Gikongoro.

In Butare, AGROSA's growth has a led to a three-fold increase over five years in the sale of high-quality stock seeds and veterinary products, a rate that fertilizer sales have not matched. According to the head of AGROSA, fertilizers are only bought as a complement to the seeds and therefore don't generate much revenue.

4.2. Growth at the user level/in the number of users.

In the potato-producing areas, the farmers report a 100-percent increase in the number of fertilizer users between 1999 and 2002. The quantities used by each person have also increased here. For example, COODAF has seen its sales to the associations grow from 30 tons per season in 2000 when it started operating to 75 tons per season in 2001, and hopes to sell 100 tons per season in 2002. COODAF's stringent insistence on producing quality seeds and accuracy in fertilizer use lends credibility to these figures.

In the southern regions of Gisenyi and Ruhengeri provinces, as well as in the other provinces visited, the growth tendency is good. For example, the association Abakundumurimo of Rubengera in Kibuye has sold 500 kilograms of fertilizer in 2000 and 1000 kilograms in 2001.

In Gikongoro, the users, especially the associations, used to receive free fertilizer from the projects and the NGOs, but now have to buy it themselves, and the quantities used are much smaller than before.

All those contacted are of the opinion that a drop in fertilizer price will contribute increased use throughout the whole country. The farmers interviewed think that a price between 150 and 170 RF per s will lead to a 25 to 50 percent increase in quantities used. However, the importers argue that they cannot drop the price below the current level, 180 RF per kilogram) due to purchase and transportation costs.

CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

The fertilizer market is rife with potential, especially at the province level where much information on fertilizer use needs to be spread. The extension services of MINAGRI have a role to play in the effort to increase fertilizer use. The second obstacle remains the very low buying power of the potential users. For example, farmers in the potato-producing areas, farmers know a lot about the benefits of using fertilizers and are willing to increase their inputs, but lack the financial means to do so. Thus, it is important to help them in that area. For instance, the revenue-generating activities of MINAGRI's Projet d'Appui au Secteur Rural (project for assistance to the rural sector) should be increased.

Almost all the fertilizer retailers and wholesalers lack the proper training in handling their product. The Ministry of Agriculture, Livestock, and Forestry should organize training sessions for those involved with the fertilizers, tailored to fit their level of involvement. These sessions would be ideal for disseminating information to the end users through the trainees. Leaflets and pamphlets describing proper doses could be printed and made available to the traders who would pass them on to their customers.

At the national level, the chemical composition of the fertilizers used is the same for all the regions while soil composition varies from one region to another and from one crop to another. ISAR should conduct studies and soil analyses in different parts of the country in order to determine the right fertilizer to be used on specific crops and specific soils.

Poor road conditions make fertilizer transport, as well as that of other agricultural products, very difficult. Thus, road improvement activities are to be encouraged in order to facilitate access to the sales points. The ministry in charge of transport should collaborate with the local governments in this effort.

Ninety-eight percent of those interviewed blame the lack of increase in individuals' fertilizer use on their limited financial resources. Revenue-generating activities might provide a surplus that the farmer could invest into agriculture.

However, the total quantity of fertilizer used in Rwanda increases annually, which leads to the conclusion that the number of users must be increasing as well. Thus, the importers believe that setting up a fertilizer factory in the country is highly desirable. Initiatives in that direction have to be encouraged in order to break the dependency on foreign fertilizer. A feasibility study for the setting up of the fertilizer factory would be paid for by the Ministry of Commerce, Industry, and Tourism.

In Kibuye, fertilizer marketing faces a major setback when the project FCD closes down and the associations need help in their efforts to prevent that. DRSA, PDMAR, FCD, and the representatives of various fertilizer-trading organizations should collaborate in strengthening the existing structure and making it more autonomous. MINAGRI's Projet d'Appui au Secteur Rural (Project for Assistance to the Rural Sector) should also help.

There is a great deal of suspicion around the origin of some of the fertilizer sold in the country and fertilizer importers should be required to present a certificate of origin for their products to their customers. There should also be a system for regularly checking the quality of the fertilizer stored in the warehouses. The Ministry of Agriculture, Livestock, and Forestry, and the Ministry of Commerce,

Industry, and Tourism would set up such a system and help the investors take over the duties of performing the checks.

The traders should get more help and subsidies from the public services in popularizing fertilizers, now that the agricultural monitors are no longer active. PGERB, PDMAR, COODAF, and various NGOs are already engaged in agricultural extension activities, such as the distribution of high-quality stock seeds, advice to the farmers, and demonstrations sessions. But these organizations can only reach relatively few people. Fertilizer popularization campaigns need to be intensified and should take place in public places like the primary schools, the fertilizer trading associations, and the local public facilities. It should also be conducted on the different crops.

The limited market for excess agricultural production is a factor in the farmers' decision not to intensify their fertilizer use. Traders, in collaboration with the Ministry of Commerce, Industry, and Tourism, could help create sale, transformation, and/or conservation facilities for agricultural products. That same ministry would be in charge of creating the necessary public infrastructure (roads and markets) and would publish information on the market conditions and the existing opportunities.